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DIVISION OF ENVIRONMENTAL SCIENCE AND ENGINEERING

AIR POLLUTION CONTROL

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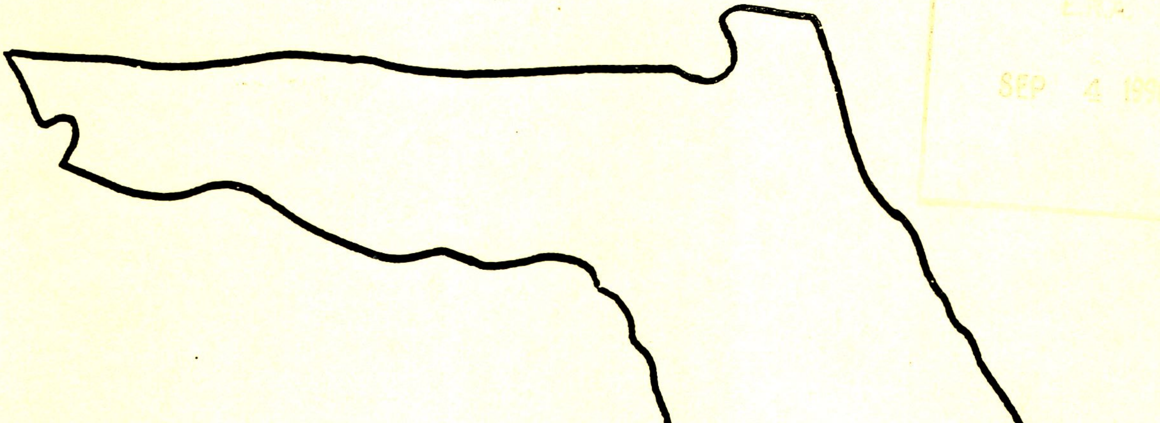

ANNUAL REPORT 1989

HRS
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

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I

INTRODUCTION

Palm Beach County is located along the southeast coast of Florida, and is part of what is generally called the "Florida Gold Coast". The "Gold Coast" consists of four counties: Palm Beach, Broward, Dade and Monroe. Palm Beach County is geographically separated into two regions: one region is a highly urbanized coastal strip, stretching approximately forty-five (45) miles from Tequesta on the north, to Boca Raton on the south: and the other is agricultural, located in the western portion of Palm Beach County (The Glades Area).

The population distribution within the County depicts this same unusual pattern. Virtually all of the population is located in two relatively small areas: the coastal strip adjacent to the Atlantic Ocean and along a narrow band adjacent to Lake Okeechobee. A population table is included in this section (Table 1).

The majority of the population, approximately 90%, is located on the coast from a distance of approximately 15 miles inland from the Atlantic Ocean. Developments through the years have resulted in several municipalities along the coastal strip.

The band adjacent to Lake Okeechobee contains virtually all of the remaining 10% of the County's population. Municipalities which are included in the Glades area are: Belle Glade, Pahokee and South Bay. The economy of this area is an agricultural one, based principally on sugar cane and winter vegetables.

Tourism and related fields continue to be the major economic factors in the urban area. Tourism has increased along with increased population. Other major industries in the area include building construction and related fields, agriculture, aircraft testing facility, electronics, cement and concrete, asphaltic concrete and the service industries.

The complexity of the problems of Air Pollution Control are related to the widespread growth of Palm Beach County. Advances in environmental protection activities, which are being carried out by this program, have been utilized in order to keep abreast of air pollution problems. These activities are characteristic of urban areas across the nation.

The review of applications for the state air permits is one of the many activities handled by the Air Pollution Control Section of the Palm Beach County Public Health Unit. The Florida Department of Environmental Regulation requires both a permit to construct and a permit to operate any air pollution source. The review of permit applications places our local program in a position to prevent the improper construction of a pollution source and to assure that adequate pollution control equipment is utilized and maintained.

Other activities include: consultations with industries and engineers on impending permit action; enforcement action; maintenance of monitoring network; and required compliance schedule and increments of progress surveillance.

Also, our local program investigates and initiates the necessary follow-up action regarding all citizen complaints. As part of the State Air Implementation Plan, this agency is required to conduct source inspections of existing and new sources in Palm Beach County, in order to assure that all sources are in compliance with Air Pollution Regulations.

One challenge our Air Pollution Control Section faces in the immediate future is dealing with the increasing problem of Mobile Source related air pollution.

Presently, Palm Beach County has not attained the National Ambient Air Quality Standard (NAAQS) for the criteria air pollutant Ozone. Unlike ozone in the upper atmosphere, where it is beneficial and protects humans from harmful ultraviolet sunlight, ozone at ground level is a harmful air pollutant that can cause adverse health effects to humans, plants and animals.

Automobile exhaust emissions are the primary contributors to the formation of Ozone. The large number of automobiles registered in Palm Beach County (approx. 800,000), coupled with a higher than average tampering rate of emission control device, is causing a serious air pollution problem.

State lawmakers in Tallahassee recently responded to this problem and passed the "Clean Outdoor Air Law" (COAL). The law will require annual exhaust emissions testing on vehicles, 1975 and newer, that are registered in Palm Beach County. The testing program is scheduled to be implemented in early January 1991.

In order to prepare the general public for the new emissions testing programs, the Air Pollution Control Section routinely provides FREE auto emissions testing during special events such as "Clean Air Week" and "Car Care Month". The section's Public Education Program has also been expanded to include automobile anti-tampering presentations to elementary and high schools, auto service industries and various auto trade associations.

Air toxics is another emerging air pollution issue. The Clean Air Act Amendments requires the EPA to review and regulate hazardous and toxic pollutants. Under EPA's air toxic strategy, the responsibility for the regulation and control of toxic pollutants is shared by state and local agencies. In 1988, the Air Pollution Control Section started an Air Toxics program. One of the first tasks for the program was to complete an emission inventory of air toxics in Palm Beach County. The purpose of this inventory was to: prepare a baseline study; to identify multiple sources and their general emission strengths and patterns; and to help risk assessment in the county. Inventoried sources included large point sources as well as numerous small sources that could be considered as area sources.

It was found on completion of the Air Toxics inventory that approximately 529 metric tons of toxic pollutants were emitted in Palm Beach County in 1988. Out of 80 toxic chemicals studied, only 29 chemical compounds were reported.

The total tonnage does not seem to be very large considering the area and the population of the county. But it must be noted that this county does not have the number of facilities or the kinds of industries that would contribute to large quantities of air toxic emissions as compared to other urban areas.

The Air Pollution Control Section has also been actively working with the other local program agencies and state representatives in rule making for toxic pollutants control, and in the field of communicating the risks involved to the general public.

The air monitoring capabilities of our program continues to be the ultimate means of maintaining air quality standards in Palm Beach County. The Environmental Control Air Monitoring Laboratory located in West Palm Beach is capable of continuously measuring stationary and mobile source related pollutants, i.e., Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), and the meteorological parameters wind speed and wind direction. Ozone (O_3) is continuously monitored at two locations, one in the Village of Royal Palm Beach and the second one at the North Water Plant in Delray Beach. Both ozone sites are designated National Air Monitoring Sites (NAMS) and are also equipped to continuously monitor wind speed and wind direction. Our sulfur dioxide (SO_2) monitoring site is located in Riviera Beach. All of the continuous monitoring sites collect data through the use of recorders, plus a centrally controlled data acquisition system employing telecommunications.

In addition to the above, our air quality monitoring network includes eight (8) particulate matter monitoring sites. All analysis pertaining to air pollution is performed by our chemistry laboratory located in Delray Beach.

All data collected by our air monitoring network is transmitted via telephone lines using a video display system to the Department of Environmental Regulation in Tallahassee. The data is placed in SAROAD (Storage & Retrieval of Aerometric Data) format for transmission.

Public relation activities during the past year by the Air Pollution Section of the Palm Beach County Public Health Unit have consisted of continued steps to inform the general public of the programs and procedures established to maintain our good air quality. These activities include wide distribution of our Annual Report, extending invitations to groups of school and environmental clubs to visit our facilities, and presentations to school and civic groups throughout the County on the topic of "Air Pollution Control in Palm Beach County". In addition, a major aspect of our program's public relations activities is the dissemination, twice daily, of an "Air Quality Index" to the local news media which now includes a pollen and mold spore count. The index utilizes the daily results of all measured pollutants. The pollen and mold spore count is determined by trained laboratory personnel from daily, quantitatively collected air samples.

TABLE 1

POPULATION FOR PALM BEACH COUNTY AND MUNICIPALITIES

MUNICIPALITY	Univ. of Fla. Population Estimates 1987	Univ. of Fla. Population Estimates 1988	Univ.of Fla. Population Estimates 198
Atlantis	1,642	1,649	1,678
Belle Glade	17,184	17,009	17,195
Boca Raton	57,120	59,585	61,531
Boynton Beach	44,056	48,310	47,451
Briny Breezes	374	371	371
Cloud Lake	152	153	146
Delray Beach	43,428	44,513	48,993
Glen Ridge	225	225	223
Golf	129	131	132
Golfview	207	208	205
Greenacres City	26,201	27,295	27,547
Gulfstream	527	537	533
Haverhill	1,265	1,262	1,316
Highland Beach	3,167	3,208	3,270
Hypoluxo	702	760	672
Juno Beach	1,926	2,037	2,201
Jupiter	24,679	26,258	28,387
Jupiter Inlet Colony	398	394	393
Lake Clarke Shores	3,281	3,317	3,527
Lake Park	6,793	6,766	6,753
Lake Worth	27,249	27,471	27,643
Lantana	8,490	8,607	8,509
Manalapan	365	378	378
Mangonia Park	1,291	1,278	1,275
North Palm Beach	12,782	12,742	12,812
Ocean Ridge	1,522	1,542	1,564
Pahokee	6,633	6,610	6,559
Palm Beach	10,851	10,869	10,907

*** continued on next page****

TABLE 1
POPULATION FOR PALM BEACH COUNTY AND MUNICIPALITIES
(continued)

	Univ. of Fla. Population Estimates 1987	Univ.of Fla Population Estimates 1988	Univ. of Fla. Population Estimates 1989
Palm Beach Gardens	22,902	24,180	26,644
Palm Beach Shores	1,268	1,263	1,271
Palm Springs	10,152	10,284	10,403
Riviera Beach	28,001	29,191	29,017
Royal Palm Beach	8,496	11,536	14,404
South Bay	3,666	3,736	3,670
South Palm Beach	1,460	1,473	1,472
Tequesta	4,126	4,179	4,479
West Palm Beach	71,336	73,830	74,284
Total Incorporated	454,045	460,988	487,815
UNINCORPORATED	335,488	368,961	377,692
TOTAL COUNTY	789,533	829,949	865,507

II

METEOROLOGY

Topography is of primary importance whenever the meteorological aspects of a given region are to be evaluated. Palm Beach County is a fairly level region. For the most part, Palm Beach County is between 10 and 20 feet above sea level. All urban development is located along the eastern 15 miles of the coastal strip. Most of the western portions of the County are covered by agricultural lands or everglades.

The agricultural lands are endowed with a rich peatlike "muck" soil. The Atlantic Ocean borders the eastern edge of the County and the Gulf stream flows northward approximately 3 miles off-shore. Seldom does a cold air mass reach this region without being modified due to marine influences and our southern location. Light freezes occur infrequently along the coastal areas of the County and more frequently in the everglades and agricultural areas. The most eastern parts of the County come under the influence of the sea breeze during the day and land breeze during the night. Based on weather data accumulated at Palm Beach International Airport (Table 2), August is the warmest month with a mean of 82.7^{O}F, a maximum mean of 90.6^{O}F, and minimum mean of 74.8^{O}F. From the same data, January is the coldest month with a mean of 65.7^{O}F, a maximum mean of 75.0^{O}F, and a minimum mean of 56.4^{O}F. Rain showers and/or thunderstorms of short duration are frequent during the summer season.

Palm Beach County receives the greatest amount of rainfall during the summer and fall. As indicated in Table 2, the County receives an average 61.1 inches of rain per year.

Palm Beach County can be classified as a semitropical region. The quasi - permanent location of the "Bermuda" high pressure area governs our weather. It causes our prevailing easterly surface winds in addition to supplying the warm moist air necessary to produce the frequent air mass, frontal or nocturnal rain-showers and/or thunderstorms that occur in the County.

The position of the "Bermuda" high pressure area is also conducive to the formation of an atmosphere capable of causing high pollution days. This atmosphere can easily occur if cold air from the north moves underneath the warm moist air brought into the County by the "Bermuda" high. The result is a temperature inversion or increase of temperature with height which traps the pollutants in the lower levels.

Meteorological parameters play a significant role in understanding the over-all air pollution cycle. The motions of the atmosphere are extremely variable and must be thoroughly examined in order to determine the movement and dispersement of pollutants. Both wind direction and wind speed are of primary importance. The surface wind and the wind found in the first few hundred feet of our atmosphere must be studied to determine diffusion and movement of the pollutants.

The wind direction is indicative of the direction of travel of the pollutants. The wind speed determines the time it takes the pollutants to travel to a receptor and is a function of the amount of dilution of pollutant. Light winds, coupled with other factors, contribute to poor air quality episodes. U.S. Weather Service records of Palm Beach International Airport show the prevailing wind directions for the months of February through November are from one of the easterly headings. Mean monthly speeds vary between 7.6 mi/hr in July and 10.8 mi/hr in April (Table 2). The wind direction and speed for 1989 (Table 3) taken at our continuous monitoring site in West Palm Beach shows that a higher percentage of winds were from the east-northeast, east, or east southeast directions and the majority of the wind speeds were in the 4-10 mi/hr category. Table 3, table 4 and table 5 (wind direction and speed), for our Royal Palm Beach (NAMS), 20 mile bend (NAMS) and Delray Beach (SLAMS) sites respectively are included in this section for information purposes. 20 Mile Bend was discontinued as of August 1988.

TABLE 2

PALM BEACH INTERNATIONAL AIRPORT

METEOROLOGICAL MEANS

(1960-1989)

MONTH	MEAN MAXIMUM TEMP.	MEAN MINIMUM TEMP.	MEAN MONTHLY TEMP.	MEAN MONTHLY PRECIP.(IN)	PREVAILING WIND DIRECTION	MEAN WIND SPEED(mi/hr)
January	75.0	56.4	65.7	2.77	NW	9.9
February	76.0	56.8	66.4	2.80	SE	10.4
March	79.2	61.1	70.2	3.65	SE	10.8
April	82.6	65.2	73.9	3.01	E	10.8
May	85.9	69.5	77.7	5.98	ESE	9.8
June	88.7	72.8	80.8	8.08	ESE	8.2
July	90.3	74.4	82.4	6.00	ESE	7.6
August	90.6	74.8	82.7	5.96	ESE	7.7
September	88.7	74.5	81.6	8.97	ENE	8.7
October	84.7	70.4	77.6	6.73	ENE	10.2
November	80.0	64.3	72.2	4.73	ENE	10.2
December	76.4	58.9	67.7	2.44	NNW	10.0
Yearly	83.2	66.6	74.9	61.12	ESE	9.5

TABLE 3

SITE # 25 - PBI

WIND DIRECTION AND SPEED (MI/HR) OCCURRENCES

1989

DIRECTION	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	PERCENT
WIND SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
22-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
19-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
16-18	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		1	0.01
13-15	0	0	0	0	0	2	1	1	0	0	0	0	1	11	13	0		29	0.33
10-12	3	0	1	0	3	9	29	25	5	0	1	0	0	20	54	15		165	1.89
7- 9	62	104	68	48	86	187	200	101	25	6	14	0	3	37	76	113		1130	13.0
4- 6	102	189	386	340	424	410	276	147	91	43	40	13	29	58	160	206		2914	33.5
1- 3	110	75	251	280	272	208	223	158	167	108	184	127	99	179	355	361		3157	36.3
Calm																	1291	1291	14.8
TOTAL	277	368	706	668	785	816	729	432	288	157	239	140	132	306	658	695	1291	8687	100
PERCENT	3.18	4.23	8.12	7.68	9.03	9.39	8.39	4.97	3.31	1.80	2.75	1.61	1.51	3.52	7.57	8.00	14.8	100	

TABLE 4
SITE #21 - RPB
WIND DIRECTION AND SPEED (MI/HR) OCCURRENCES
1989

DIRECTION	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	PERCENT
WIND SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
22-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
19-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
16-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
13-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
10-12	53	0	0	0	0	0	0	0	0	0	4	3	0	1	2	13		76	0.87
7- 9	109	1	0	0	0	16	43	45	10	7	18	4	1	4	12	44		314	3.60
4- 6	228	33	8	16	46	350	365	165	66	40	38	28	23	23	49	78		1556	17.8
1- 3	558	197	173	178	372	578	343	269	224	179	187	112	107	90	82	187		3836	44.0
Calm																	2917	2917	33.5
TOTAL	948	231	181	194	418	944	751	479	300	226	247	147	131	118	145	322	2917	8699	100
PERCENT	10.8	2.65	2.08	2.23	4.80	10.8	8.63	5.50	3.44	2.59	2.83	1.68	1.50	1.35	1.66	3.70	33.5	100	

TABLE 5
SITE #16 - WMD
WIND DIRECTION AND SPEED (MI/HR) OCCURRENCES
1989

DIRECTION	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	PERCENT
WIND SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
22-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
19-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0		2	0.03
16-18	0	1	0	0	0	0	0	0	0	0	0	0	0	1	4	3		9	0.17
13-15	10	3	0	0	0	0	0	0	0	0	0	0	0	0	13	26		52	0.99
10-12	15	11	3	0	0	0	13	3	1	0	0	0	0	1	20	34		101	1.93
7- 9	35	22	19	17	51	86	154	70	19	5	6	0	2	4	33	47		570	10.9
4- 6	49	44	41	42	139	156	221	117	44	13	15	12	20	28	83	69		1093	20.9
1- 3	147	97	125	121	151	159	293	238	112	106	84	52	73	65	136	134		2093	40.1
Calm																	1288	1288	24.7
TOTAL	256	178	188	180	341	401	681	428	176	124	105	64	95	99	291	313	1288	5208	100
PERCENT	4.91	3.41	3.60	3.45	6.54	7.69	13.0	8.21	3.37	2.38	2.01	1.22	1.82	1.90	5.58	6.00	24.7	100	

TABLE 6
SITE #29 - DB
WIND DIRECTION AND SPEED (MI/HR) OCCURRENCES
1989

DIRECTION	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	PERCENT
WIND SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
22-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
19-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
16-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
13-15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0		2	0.06
10-12	0	5	13	1	0	0	2	0	0	0	0	0	1	7	13	3		45	1.41
7- 9	1	43	109	80	26	11	30	20	2	1	2	2	12	24	39	33		435	13.6
4- 6	29	37	95	208	173	182	114	43	23	17	14	8	20	44	94	77		1178	37.0
1- 3	49	27	50	113	117	125	78	40	39	34	26	29	27	55	129	126		1064	33.4
Calm																	455	455	14.3
TOTAL	79	112	267	402	316	318	224	103	64	52	42	39	60	131	276	239	455	3179	100
PERCENT	2.48	3.52	8.39	12.6	9.94	10.0	7.04	3.24	2.01	1.63	1.32	1.22	1.88	4.12	8.68	7.51	14.3	100	

III

TECHNICAL STUDIES

INTRODUCTION

The ambient air monitoring program in Palm Beach County at the end of 1989 consisted of the following:

Particulate Matter - 8 Sites

Total Gravimetric

Continuous Gaseous Monitoring - 4 Sites

Site 25
Nitrogen Dioxide

Carbon Monoxide

Site 28
Sulfur Dioxide

Sites 21 & 29
Ozone

Continuous Meteorological Monitoring - 3 Sites

Site 25
Wind Speed

Wind Direction

Site 21 & 29
Wind Speed

Wind Direction

All criteria pollutant data collected is reported monthly to the Department of Environmental Regulation and to the Environmental Protection Agency for inclusion in air quality data banks (SAROAD). Gaseous pollutant levels and meteorological conditions from sites #21, 28, 25 and 29 are relayed by data line to the agency's office by a Sumx Corporation data acquisition system. Instantaneous levels of these parameters are available at all times. One hour averages are calculated and recorded.

Locations of the monitoring sites are shown in Figure 1. Table 6 gives site identification numbers, addresses, and parameters measured for all current monitoring sites within the County. Table 7 provides similar information concerning discontinued monitoring sites. Table 8 relates measured air quality within Palm Beach County for the year 1989 to the Federal and State Ambient Air Quality Standards.

PERMANENT MONITORING NETWORK

The original monitoring network for suspended particulate, sites one through eight, was established in 1969 (Site 1A excluded). The Military Trail intercept line, sites nine through twelve, was added in 1972.

Periodic automated monitoring of sulfur dioxide, nitrogen dioxide and total oxidants (Site 1 through 8) was begun in June of 1971.

In 1988 three sites were discontinued; sites #4 in March, site #10 in July and site #6 in August. Site #5 was discontinued in April of 1987, site #3 in October 1986, site #7 in 1978 and site #2 in 1977.

Total hydrocarbon monitoring was begun in May of 1972 and discontinued in August of 1981. The automated gaseous and meteorological monitoring equipment was installed in the West Palm Beach monitoring station (Site 1) in November of 1972. Original Technicon Monitoring equipment for nitrogen dioxide, sulfur dioxide and total oxidants was replaced during the third quarter of 1973. Total oxidant monitoring was replaced by ozone monitoring at this time. Site 1 was maintained as the central monitoring station for gaseous pollutants, T.S.P., and meteorological parameters until March 1979, when the ozone monitor was relocated in Royal Palm Beach (Site 21). A second rural ozone monitor was placed on line in January 1980 at the South Florida Water Management Pump Station (Site 16) in accord with the National Air Monitoring Stations (NAMS) network. Site #16 was discontinued and a new site established at the North Water Plant in Delray Beach in August 1989. Relocation of the SO_2 monitoring site to Riviera Beach in July 1980, completed the State and Local Air Monitoring Stations (SLAMS). The SO_2 site was moved to the new location (site #28) in 1988. In June of 1986, Site 1 was relocated to the Palm Beach International Airport, 3700 Belvedere Road, West Palm Beach. Network design is summarized in Table 9.

A special study of sulfur dioxide levels and meteorological parameters was conducted in Belle Glade (Site 8), from September of 1972 until May 1978.

Two manual stations for the measurement of nitrogen dioxide were established in November 1973 and maintained until October of 1978 as required by the State Implementation Plan. Manual sulfur dioxide stations have been operated periodically as part of special study projects.

PARTICULATE MONITORING

Methodology: Standard High volume samplers and shelters are located at each sites. In 1988, three sites were discontinued; site #4 in March, site #6 in August and site #10 in July. Particulate monitoring was established at site #25 in August 1988. Also in 1988, a new standard was adopted for particulate matter. The old standard was based on total suspended particulate matter whereas the new standard is based on the inhalable fraction of particulate matter considered to be less than 10 Micrograms per cubic meter (PM-10).

In 1989, 3 sites were converted to monitor PM-10. Remaining sites with TSP samples are designated as surrogate PM-10 sites. There are presently eight sites in the network.

Samples were collected and handled in accordance with Referenced Method for the Determination of Suspended Particulates in the Atmosphere (High Volume Method), Federal Register, Vol. 36, No. 84 - Friday, April 30, 1971. Sampling time is twenty-four hours, running from midnight to midnight, for each sampling date. The standard six day schedule as recommended by EPA is followed. PM-10 sites were added in December of 1989.

Tabulated results for suspended particulates for the year 1988 are presented in Tables 10 and 11. Figure 2 presents the range of probable logarithmic values for suspended particulates at all ten stations for the years 1986 and 1987. A historical summation for total suspended particulate measurements from 1969 thru 1988 is presented in Table 12. Accuracy, Precision and completeness for the year are as follows:

1989 PBCPHU **TOTAL SUSPENDED PARTICULATES**	%		%	**EPA Goal**
Precision	13.18	-	10.14	No more than +/- 15%
Accuracy	-0.70	-	-3.82	No more than +/- 15%
Completeness	93%			at least 75%

1989 PBCPHU **PM-10**	%		%	**EPA Goal**
Precision	9.18	-	-5.42	No more than +/- 15%
Accuracy	N/A	-	N/A	No more than +/- 15%
Completeness	80%			at least 75%

GASEOUS MONITORING

Maximum ambient air concentrations for gaseous sampling in Palm Beach County for the period 1970-1988 are presented in Table 13.

NITROGEN DIOXIDE (SLAM)

Continuous automatic monitoring for this pollutant was conducted at Sites 1 & 25.

A MEC Model 1200 NO-NO_x (McMillan Electronics Corporation) Chemiluminescence analyzer was in use from November 15, 1973 until December 27, 1977. At this time it was replaced by Monitor Laboratory Model 8440. This monitor was replaced by a Monitor Labs 8840 on Feburary 13, 1985, and by a new Monitor Labs 8840 on October 28, 1988. Table 14 presents monthly and annual sampling time, arithmetic means and twenty-four hour maximum concentrations. Table 15 includes quarterly and annual, one, eight and twenty-four hour concentration maximums, annual arithmetic means and the frequency distribution of ranges of pollutant levels recorded. Values recorded placed the measured concentrations of this pollutant well below those of the Ambient Air Quality Standards.

Accuracy, Precision and completeness for the year are as follows:

	1989 PBCPHU NITROGEN DIOXIDE %	%	EPA Goal
Precision	16.27	- -5.21	No more than +/- 15%
Accuracy			
Range			
0.08-0.10 ppm	- 1.08	- -8.18	No more than +/- 20%
0.15-0.20 ppm	- 3.41	- -5.07	No more than +/- 20%
0.40-0.45 ppm	- 1.47	- -6.16	No more than +/- 20%
Completeness	91%		at least 75%

CARBON MONOXIDE (SLAMS)

This pollutant was monitored continuously at Site No. 1. A Mine Safety Appliances, Model 200 non-dispersive infrared spectrophotometric automatic analyzer, in service since January 1971, was retired and replaced by a Model 202-S on October 6, 1977. This monitor was replaced by a Teco 48 on Feburary 5, 1985. This monitor was replaced by a new Teco 48 on April 2, 1987, and the original placed in reserve. Site #1 was discontinued in 1986 and relocated to site #25 at Palm Beach International Airport, West Palm Beach. Table 16 presents a monthly record of sampling hours, one and eight hour maximums, and relates concentration maximums to the Ambient Air Quality Standard. There were no recorded values in excess of the one hour or eight hour standards during the reported period.

Table 17 presents quarterly, one and eight hour maximum values and frequency distribution of all recorded pollutant levels. Accuracy, precision and completeness for the year are as follows:

1989 PBCPHU CARBON MONOXIDE	%		%	EPA Goal
Precision	5.20	-	-2.91	No more than +/- 15%
Accuracy				
Range				
3 - 8 ppm	1.54	-	-0.16	No more than +/- 20%
15-30 pmm	2.15	-	0.54	No more than +/- 20%
40-45 ppm	3.64	-	0.51	No more than +/- 20%
Completeness	96%			at least 75%

OZONE (NAMS)

This pollutant was monitored continuously at Site 1 from September 6, 1973 thru 1978. The instrumentation was a MEC Model 1100 (McMillan Electronic Corporation) Chemilumenescence analyzer. In 1978 the instrument was modified by the manufacturer to EPA designated reference method status. The monitor was relocated to Royal Palm Beach, Site 21, and placed in service there March 1, 1979.

In January, 1980 a Monitor Labs Model 8410 ozone monitor, went on line at the South Florida Water Management Pump Station (Site 16). This completed the EPA mandated NAMS ozone monitoring network for Palm Beach County. On December 19, 1983 these two monitors were reassigned, the Monitor Lab was transferred to Royal Palm Beach and the McMillan to the South Florida Pump Station. On November 9, 1984 the McMillan analyzer was replaced by a Monitor Labs 8810(225) UV Photometer analyzer. On February 2, 1986 the Monitor Labs 8410 was retired to stand by status and replaced by a Monitor Labs 8810 (359). On January 23, 1987, the monitor Labs 8810 (225) was retired to stand by and replaced by a monitor Labs 8810 (450).

The Dasibi Model #1003 PC, which had functioned as the calibration system since December, 1978 was reassigned to transfer calibrator status in 1980 in conjunction with a Columbia Scientific Photocal 3000 primary standard. On September 4, 1986 the CSI was replaced by a Dasibi 1008 PCC as the primary standard. In October 1988, a second Dasibi 1003 PC was put into service as a transfer standard. The equipment at site #16 was relocated to site #29 in Delray Beach (August, 1989).

Tables 18 and 20 present a monthly record of hours sampled and one hour maximum recorded at each site. There were no values recorded which exceed the Federal Ambient Air Quality Standard for this pollutant.

One, eight and twenty-four hour maximum and the frequency distribution for all pollutant levels recorded are presented on a quarterly basis in Tables 19 and 21.

Tables 22 and 23 give the design values or expected maximum hourly averages for these sites based on the last three years data using the Weibull distributions. No credit is given for "seasonal free days" in these calculations. Accuracy precision and completeness for the year are as follows:

1989 PBCPHU **OZONE**	%		%	EPA Goal
Precision	0.70	-	-10.61	No more than +/- 15%
Accuracy				
Range				
0.08-0.10 ppm	11.28	-	- 1.57	No more than +/- 20%
0.15-0.20 ppm	10.36	-	1.84	No more than +/- 20%
0.40-0.46 ppm	9.94	-	3.33	No more than +/- 20%
Completeness		97%		at least 75%

SULFUR DIOXIDE (SLAMS)

Monitoring instrumentation is a Monitor Labs Model 8850 Fluorescent monitor which replaced the Beckman 904-A Sulfur Dioxide analyzer, based on coulometric titration. On July 23, 1986, the monitor Labs 8850 was replaced by a new monitor Labs 8850.

Site 22, located in Riviera Beach was established in July, 1980 to monitor sulfur dioxide levels in the coastal region of the County. Site #22 was discontinued and the analyzer relocated to a new site in Rivera Beach (#28) in May 1988. Table 24 reports a monthly history of hours sampled, one, three, and twenty-four hour maximums, and the number of violations for each of the related standards. Table 25 presents quarterly and annual maximum values and a frequency distribution of values recorded. Calculation of an arithmetic mean for this pollutant is not feasible because ninety-nine percent of the values are below the limit of sensitivity for the instrument. Precision, accuracy and completeness for the year are as follows:

	1989 PBCPHU **SULFUR DIOXIDE**			EPA Goal
	%		%	
Precision	3.53	-	-5.33	No more than +/- 15%
Accuracy				
Range				
0.08-0.10 ppm	9.99	-	-5.44	No more than +/- 20%
0.15-0.20 ppm	2.89	-	-6.53	No more than +/- 20%
0.40-0.45 ppm	5.95	-	-7.22	No more than +/- 20%
Completeness	92%			at least 75%

TABLE 6

CURRENT MONITORING SITE LOCATIONS

SITE NO.	ADDRESS	UTM ZONE 17	MONITORING CAPABILITY
1A	Palm Beach County Public Health Unit 901 Evernia Street West Palm Beach, Florida	2955030N 0593232E	Susp. Part. 1969-89
12	College of Boca Raton S. Military Trail Boca Raton, Florida	2918354N 0587320E	Susp. Part 1979-1989
16	South Florida Water Management Pump Station Twenty Mile Bend State Road 80	2951402N 0562879E	Susp. part 1976-89
21	Royal Palm Beach R.V. Area 10999 Okeechobee Boulevard Royal Palm Beach, Florida	2954150N 0578100E	O_3 Meteorology 1979-89
24	Glades Central High School 425 W. Canal St. No. Belle Glade, Florida	295180N 053245E	Susp. Part. 1985-1989
25	Palm Beach International 3700 Belvedere Road West Palm Beach, Florida.	29523810N 0589524E	NO_2 CO Meteor 1986-89 Susp.part 1988-89
26	P.G.A. 3188 P.G.A. Blvd. Palm Beach Gardens, Florida	2969073N 0591000E	Susp. Part. 1986-89
27	Delray Beach Lab. 345 S. Congress Ave. Delray Beach, Florida	292617N 0590023E	Susp. Part. 1987-1989
28	Palm Beach County Public Health Unit Warehouse 1050 15 Street West Riviera Beach, Florida	296180N 059235E	SO_2 1989
29	North Water Plant 202 NW 1st Avenue Delray Beach, Florida	292617N 0590023E	O_3, Meteorology 1989
30	Everglades Memorial Hospital 200 S. Barfield Highway Pahokee, Florida	0296750N 0533700E	Susp. part 1989

TABLE 7

DISCONTINUED MONITORING SITE LOCATIONS

SITE NO.	ADDRESS	UTM ZONE 17	MONITORING CAPABILITY
1	West Palm Beach Water Treatment Plant First Street and Tamarind Avenue West Palm Beach, Florida	2955030N 0593232E	NO_2-1970-86 CO-1972-86 Gaseous-1970-81 Meteorology
2	Tequesta Water Department 357 Tequesta Drive Tequesta, Florida	2982018N 0589963E	Susp. Part. 1969-77 Gaseous 1970-71
3	North Palm Beach Water Treatment Plant 603 Anchorage Drive North Palm Beach, Florida	2965817N 0592780E	Susp. Part 1979-86 Disc. Oct. 1986
4	Lake Worth Water Treatment Plant 301-303 College Street Lake Worth, Florida	2943537N 0592793E	Susp. Part 1979-88 Disc. March 1988
5	Delray Beach Water Treatment Plant 202 N.W. 1st Avenue Delray Beach, Florida	2927488N 0592195E	Susp. Part 1979-87 Disc. Apr. 1987
6	Boca Raton Fire Station #1 1151 N. Federal Highway Boca Raton, Florida	2915768N 05913137E	Susp. Part 1979-88 Disc. Aug. 1988
7	Royal Palm Beach Golf Course Royal Palm Beach Boulevard Royal Palm Beach, Florida	2951437N 0578767E	Susp. Part. 1969-78 Gaseous 1970-71
8	Belle Glade Water Treatment Plant 1016 West Canal Street Belle Glade, Florida	2953082N 0533160E	Susp. Part 1969-78 Gaseous 1970-78
9	Grammercy Park Water Treatment Plant Park Avenue Grammercy Park, Florida	2960537N 0587329E	Susp. Part. 1972-77
10	Southwest Fire Department 1180 S. Military Trail West Palm Beach, Florida	2949018N 0588207E	Susp. Part 1972-88 Disc. July 1988
11	St. Vincent DePaul Seminary S. Military Trail Boynton Beach, Florida	2932890N 0586927E	Susp. Part. 1972-76

TABLE 7 (Contd.)

13	NO_x SIP Site N8 Florida Atlantic University Boca Raton, Florida	2917000N 0589500E	NO_x 1973-78
14	NO_x SIP Site N9 Palm Beach Mall Palm Beach Lakes Boulevard West Palm Beach, Florida	2956000N 0590700E	NO_x 1973-78
15	Division of Forestry Lat. 26° 41'N, Long 80° 16' E Loxahatchee, Florida		Temperature Inversion 1972-85
16	South Florida Water Magt. Pump Station Twenty Mile Bend State Road 80	2951402N 0562879E	O_3 1980-88 Meteorology
17	Lake Harbor Water Treatment Plant Lake Harbor, Florida	2952230N 0518600E	Susp. Part. 1977
18	Pahokee Health Department 1759 E. Main Street Pahokee, Florida	2967222N 0533760E	Susp. Part. 1977-78
19	Belle Glade Fire Station 22 W. Avenue "A" Belle Glade, Florida	2951420N 0532900E	Susp. Part 1978 83 Discontinued November 4, 1983
20	Pahokee Sewage Treatment Plant 1050 McClure Road Pahokee, Florida	2964200N 0532300E	SUSP Part 1979-89
22	Palm Beach County Health Department Warehosue 2030 Avenue "L" Riviera Beach, Florida	296235N 059248E	SO_2 1980-88 Disc. May 1988
23	Belle Glade Health Dept. 1024 N.W. Avenue "D" Belle Glade, Florida	2953082N 053160E	Susp. Part. Discontinued May, 1985

AIR QUALITY MONITORING

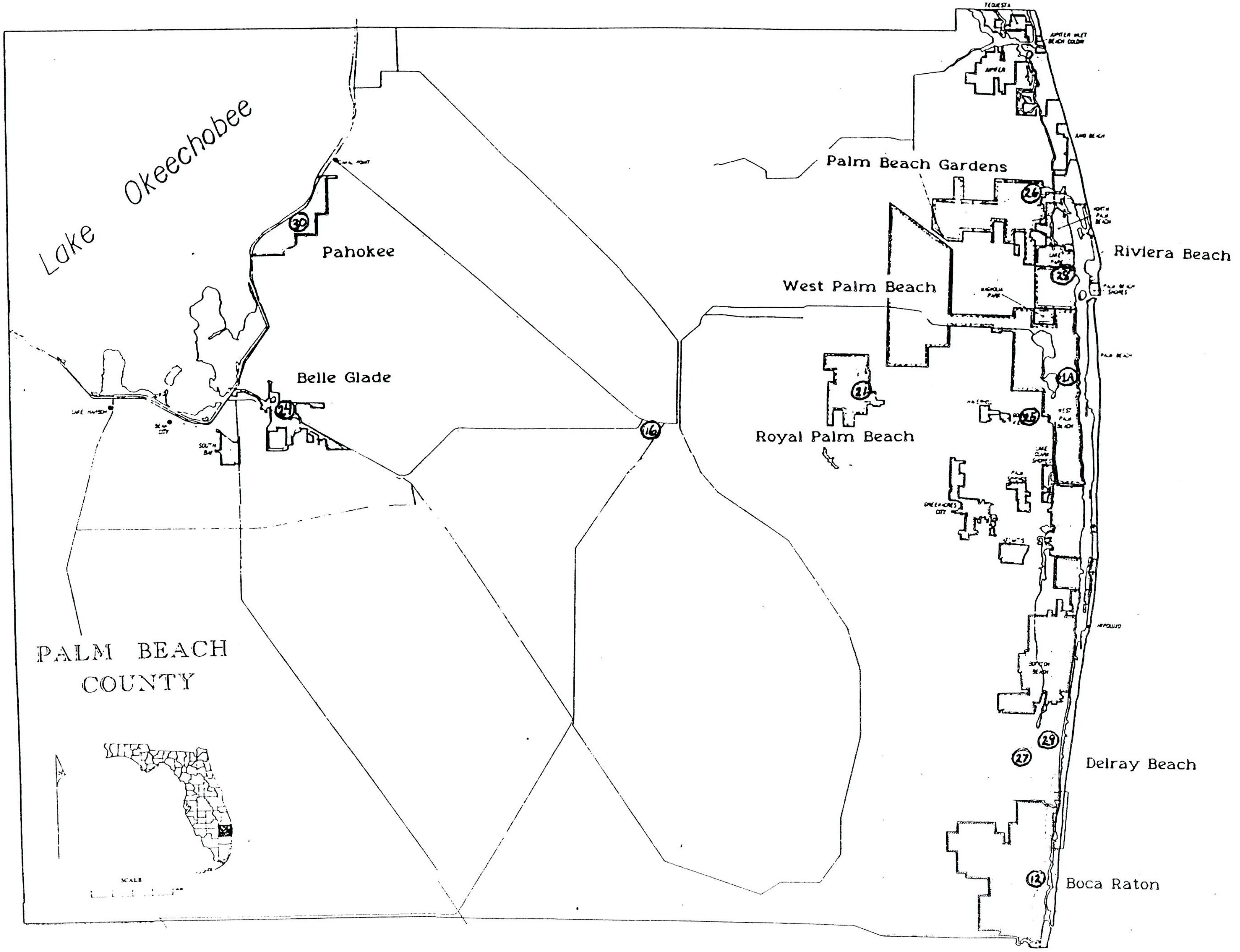

TABLE 8
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	FEDERAL PRIMARY	FEDERAL SECONDARY	STATE	MEASURED LEVELS PALM BEACH COUNTY PPM see table # 10				
				Site 16	Site 21	Site 28	Site 25	Site 29
Particulate								
Annual Arith. Mean	50 ug/ms	Same as Federal Primary	Same as Federal Primary					
Maximum 24 hrs.Conc.	150 ug/ms							
Sulfur Oxides								
Annual Arith. Mean	80 ug/m3 (0.03 ppm)		60 ug/m3 (0.02 ppm)			.003		
Maximum 24 hr. Conc.	365 ug/m3 (0.14 ppm)		260 ug/m3 (0.1 ppm)			.010		
Maximum 3 hr. Conc.(2)		1,300 ug/m3 (0.5 ppm)	1,300 ug/m3 (o.5 ppm)			.039		
Carbon Monoxide								
Maximum 8 hr. Conc.(2)	10 mg/m3 (9 ppm)	Same as Federal Primary	Same as Federal Primary				5.1	
Maximum 1 hr. Conc.	40 mg/m3 (35 ppm)						7.2	
Ozone								
Daily Maximum 1 hr. Conc.(1)	235 ug/m3 (0.12 ppm)	Same as Federal Primary	Same as Federal Primary	.099	.113			.073
NitrogenOxides								
Annual Arith. Mean	100 ug/m3 (0.05 ppm)	Same as Federal Primary	Same as Federal Primary				.013	

1. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is equal to or less than 1.

2. Concentration limits not to be exceeded more than once per year.

3. Effective May 30, 1988, the suspended particulates standards were rescinded and replaced by the PM10 Standards. PM10 is particulate matter with an aerodynamic diameter less than or equal to 10 micrometers.

TABLE 9

PALM BEACH COUNTY
NETWORK DESCRIPTION
NAMS, SLAMS AND SPECIAL PURPOSE

Urban Area	Site Address	Network	Saroad Site #	Sampler	Analysis	Pollutant	Mon.Obj.	Spatial Scale	Ope. Schedule	Implem.
Belle Glade	425 W.Canal St.No.	SLAMS	0240-007-G01	Hi Vol	Gravimetric	PM10	Hi Conc.	Neighborhood	6 day	Operational
Boca Raton	S. Military Trail	SLAMS	0280-002-G01	Hi Vol	Gravimetric	TSP	Hi Conc.	Neighborhood	6 day	Operational
DelrayBeach	345 S.Congress Ave.	SLAMS	1000-003-G01	Hi Vol	Gravimetric	TSP/PM10	Pop Exp.	Neighborhood	6 day	Operational
Palm Bch.Gdns.	3188 PGA Blvd.	SLAMS	3425-001-G01	Hi Vol	Gravimetric	TSP	Pop Exp.	Urban	6 day	Operational
Rural	20 Mile Bend Rd.	NAMS	3120-006-G03	Monitor Lab 8810	UV Photometric	O_3	Max.Conc.	Urban	cont.	Discontinued August 1989
Rural	10999 Okeechobee Blvd.	NAMS	3420-007-G01	Monitor Lab 8810	UV Photometric	O_3(EE)	Pop.Exp.	Neighborhood	cont.	Operational
Riviera Beach	1050 15th St. N.	SLAMS	3840-004-G02	Monitor Lab 8850	Fluorescent	SO_2	Max.Conc.	Neighborhood	cont.	Operational
W. Palm Beach	3700 Belvedere Rd.	SLAMS	4760-004-G01	Monitor Lab 8840	Chemilum	NO_2	Max.Conc.	Middle	cont.	Operational
W. Palm Beach	3700 Belvedere Rd.	SLAMS	4760-004-601	Hi Vol	Gravimetric	TSP	Max.Conc.	Middle	6 days	Operational
W. Palm Beach	901 Evernia St.	SLAMS	4760-003-G01	Hi Vol	Gravimetric	TSP	Pop Exp.	Neighborhood	6 day	Operational
W. Palm Beach	3700 Belvedere Rd.	SLAMS	4760-004-G01	Teco 48	Gas Correlation Infrared	CO	Max.Conc.	Middle	cont.	Operational
Rural	Twenty Mile Bend	S.P.	3420-006-G01	Hi Vol	Gravimetric	PM10	Max.Conc.	Urban	6 day	Operational
Pahokee	1050 McClure Rd.	S.P.	3340-001-G01	Hi Vol	Gravimetric	TSP	Max.Conc.	Neighborhood	6 day	Discontinued
DelrayBeach	202 NW 1st Ave.	NAMS	1000-004	Monitor Lab 8810	UV Photometric	O_3	Max. Conc.	Neighborhood	Cont.	Operational
Pahokeee	200 S. Barfield Hy	SP	3340-001	Hi Vol	Gravimetric	PM10	Max. Conc.	Neighborhood	6 day	Operational

TABLE 10

SUSPENDED PARTICULATE MATTER, 1989

	GEOMETRIC MEAN ug/m3					Geo.	CONCENTRATION ug/m3				% above or below	No. of Samples
Site	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Annual	Std. Dev.	Arith. Mean	Max.	2nd Max.	Min.	Annual Standard (60 ug/m3)	Above Daily Standard (150 ug/m3)
1A	34.3	25.7	28.0	29.9	29.5	1.57	32	67	64	8	-50.8	-0-
12	33.4	26.5	27.4	26.1	28.2	1.49	30	51	49	9	-56.5	-0-
16	39.6	29.7	29.4	35.2	33.1	1.61	37	157	98	12	-41.3	-1-
20	39.2	36.1	33.4	44.9	38.0	1.52	41	107	85	16	-25.2	-0-
24	39.6	34.3	30.9	41.5	37.0	1.58	41	102	77	13	-30.8	-0-
25	-	-	-	38.9	-	-	41	87	70	21	-	-0-
26	44.1	27.0	27.0	24.4	29.8	1.64	34	99	87	10	-59.7	-0-
27	36.8	30.4	31.5	33.6	33.0	1.43	35	65	60	14	-44.0	-0-

TABLE 11

TOTAL SUSPENDED PARTICULATES - 1989
SAMPLING DAYS

SITE NO.	NUMBER OF SAMPLES												
	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
1A	5	5	5	5	5	5	5	5	5	6	5	5	61
12	5	5	5	4	5	3	4	5	5	6	5	4	56
16	5	5	4	5	5	5	5	5	5	6	5	4	59
20	5	5	5	5	2	DISC	DISC	DISC	DISC	DISC	DISC	DISC	22
24	5	5	5	5	5	5	5	5	5	0	0	0	45
25	5	5	5	5	5	4	4	5	5	6	5	3	57
26	5	5	5	4	0	1	5	5	5	5	5	4	49
27	5	3	4	5	4	5	5	5	5	5	5	4	55

TABLE 11A

INHALABLE PARTICULATE MATTER (PM10)
SAMPLING DAYS 1989

SITE NO	NUMBER OF SAMPLES												
	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
24												3	3
27												4	4
30												5	5

NO. 340-PS 90 DIETZGEN GRAPH PAPER
PROBABILITY X 90 DIVISIONS
EUGENE DIETZGEN CO.

FIGURE

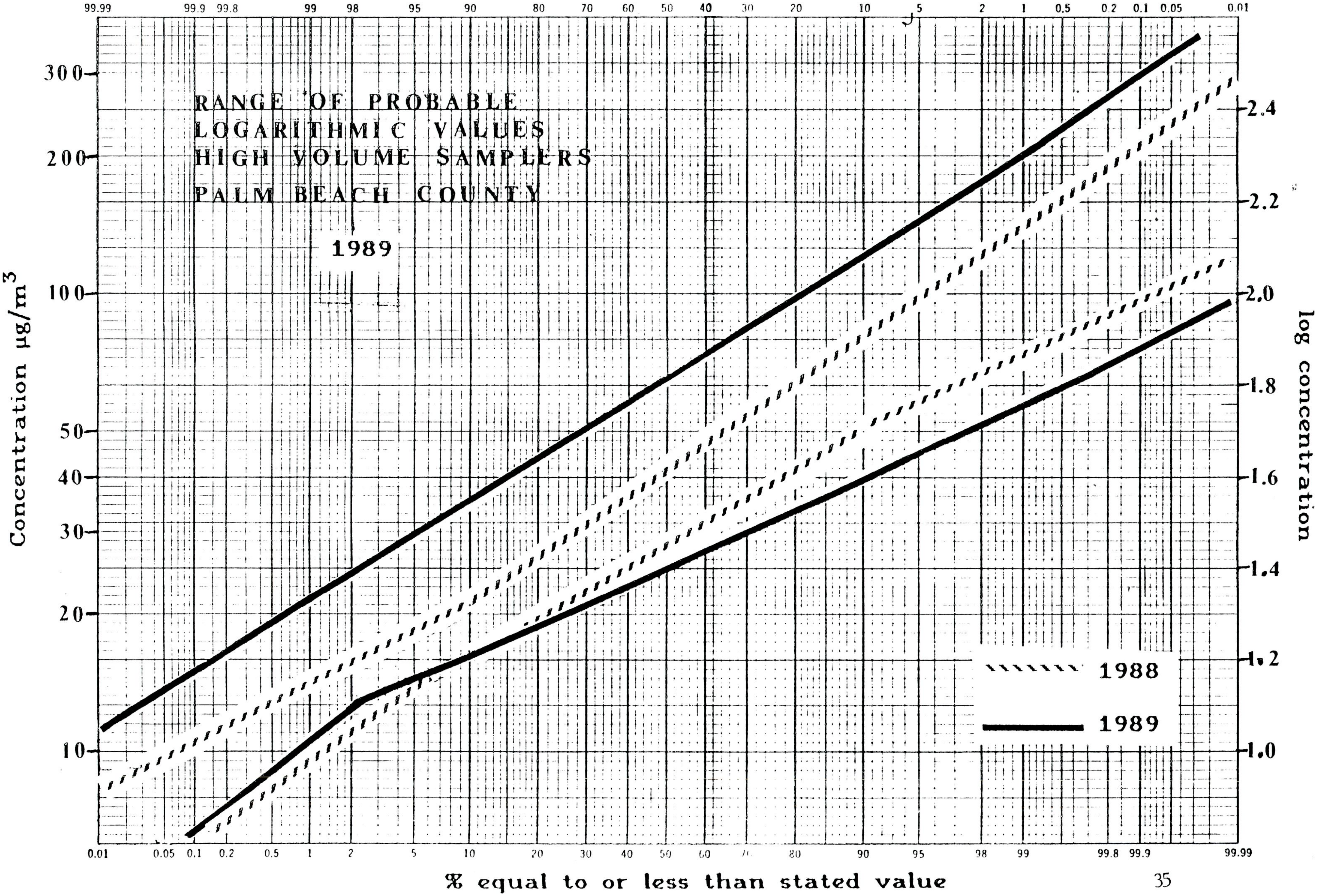

TABLE 12

TOTAL SUSPENDED PARTICULATE ug/m^3

1971-1989

Site No.	Parameter	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1A	Maximum	121.1	133.6	101.9	96.4	81.5	106.2	172	92	88	78	119	72	124	71	102	88	102	67	75
	Minimum	15.2	15.2	10.8	19.6	20.0	15.8	17	18	18	22	20	11	11	14	14	16	10	8	21
	Arith. Mean	58.7	49.9	40.5	40.9	44.7	37.4	42.0	41.3	41.0	43.9	49.4	35.3	36.8	36.7	35.2	37.1	40.8	32	31.1
	Geo. Mean	53.4	45.9	38.0	38.8	42.4	35.3	38.3	38.2	38.5	42.2	45.8	33.2	32.9	34.5	32.9	34.0	37.0	29.5	29.1
	Geo. Std.Dev.	1.19	1.49	1.49	1.38	1.39	1.41	1.50	1.47	1.44	1.34	1.48	1.45	1.57	2.10	1.45	1.51	1.58	1.57	1.44
2	Maximum	122.3	112.3	85.4	104.0	77.7	63.1	74												
	Minimum	10.7	12.2	5.3	19.6	11.9	14.0	12												
	Arith. Mean	34.6	33.0	33.6	32.4	36.4	35.5	33.6												
	Geo. Mean	30.3	31.4	30.6	34.1	33.4	30.9													
	Geo. Std.Dev.	1.61	1.48	1.49	1.36	1.45	1.44	1.50												
3	Maximum	167.5	94.8	133.2	132.7	91.8	67.8	62	65	85	90	115	59	117	54	75	53			
	Minimum	0.4	12.8	16.6	16.1	14.6	10.3	11	12	14	20	17	12	11	13	11	12			
	Arith. Mean	40.6	37.0	38.2	35.8	38.3	31.4	30.4	32.1	37.8	41.5	42.6	28.4	28.4	30.8	32.1	31.2			
	Geo. Mean	30.7	33.7	35.3	32.2	34.5	29.1	28.4	30.2	35.3	39.2	39.0	26.4	25.6	29.2	28.0	29.0			
	Geo. Std.Dev.	2.93	1.49	1.47	1.54	1.61	1.50	1.45	1.42	1.47	1.41	1.53	1.49	1.56	1.40	1.46	1.47			
4	Maximum	95.6	89.8	85.6	196.8	435.3	81.0	84	85	101	90	123	121	130	81	143	94	251		
	Minimum	10.2	12.9	13.3	18.3	19.6	12.7	14	17	20	9	25	14	13	20	13	19	9		
	Arith. Mean	37.2	34.8	37.7	45.2	57.1	38.2	41.0	44.6	44.7	47.8	49.0	38.2	38.7	42.4	40.3	41.7	49.2		
	Geo. Mean	31.7	32.2	35.3	38.8	47.9	35.8	39.1	42.1	42.0	45.0	45.3	35.1	35.0	39.9	37.0	36.9	42.5		
	Geo. Std.Dev.	1.85	1.49	1.39	1.67	1.64	1.44	1.38	1.41	1.43	1.46	1.48	1.53	1.54	1.43	1.51	1.57	1.67		
5	Maximum	142.4	108.0	92.9	81.9	83.5	61.1	81	99	102	82	122	76	126	65	134	85	119		
	Minimum	12.2	15.9	10.9	13.8	22.0	13.8	18	17	19	26	21	16	14	15	13	16	9		
	Arith. Mean	36.4	38.5	40.0	34.8	42.0	35.8	39.1	37.6	40.4	42.7	46.2	35.4	37.2	36.8	38.6	38.5	42.0		
	Geo. Mean	32.0	35.4	37.6	32.2	39.5	34.0	37.0	35.0	37.6	41.1	42.5	33.2	34.1	34.8	35.6	35.6	37.2		
	Geo. Std.Dev.	1.64	1.49	1.46	1.53	1.41	1.40	1.41	1.45	1.47	1.33	1.5	1.43	1.80	1.41	1.48	1.49	1.71		

TABLE 12 (cont.)

TOTAL SUSPENDED PARTICULATE ug/m3
1971-1989

Site No.	Parameter	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
6	Maximum	237.9	275.3	106.5	92.4	114.8	62.8	79	107	124	94	131	70	134	67	146	78	100	64	DISC.
	Minimum	13.3	17.0	13.6	20.9	22.4	16.4	15	18	19	26	25	15	14	17	16	20	8	11	DISC
	Arith. Mean	49.1	44.9	43.1	41.6	45.4	35.6	39.3	42.2	47.3	47.0	48.6	27.8	36.3	37.1	39.6	37.5	42.0	36	DISC
	Geo. Mean	41.1	39.9	40.2	38.4	42.7	33.8	37.0	39.3	43.8	44.8	45.7	32.6	33.4	34.9	37.0	35.4	38.6		
	Geo. Std.Dev.	2.09	1.56	1.46	1.26	1.43	1.38	1.43	1.45	1.48	1.37	1.42	1.47	1.48	1.42	1.43	1.40	1.54		
7	Maximum	131.5	102.0	65.5	98.3	70.5	55.2	64	36											
	Minimum	1.6	7.0	9.1	5.4	11.4	6.2	9	17											
	Arith. Mean	30.7	31.8	28.1	25.6	33.0	23.1	24.3												
	Geo. Mean	24.4	28.3	26.2	22.3	30.4	21.0	22.5												
	Geo. Std.Dev.	2.13	1.37	1.45	1.66	1.52	1.55	1.49												
8	Maximum	222.7	173.3	151.0	210.9	199.4	125.2	149	143											
	Minimum	12.6	19.8	20.3	22.8	10.7	12.6	17	22											
	Arith. Mean	61.4	58.6	59.8	59.8	62.4	61.6	59.0	58.8											
	Geo. Mean	53.1	52.3	54.0	54.2	56.7	56.3	54.6	53.1											
	Geo. Std.Dev.	1.64	1.60	1.61	1.57	1.56	1.56	1.49	1.57											
9	Maximum		74.50	145.3	81.2	65.3	59.1	33												
	Minimum		13.30	11.7	11.3	16.1	9.6	20												
	Arith. Mean		31.2	33.2	29.9	34.1	28.2													
	Geo. Mean			28.7	30.7	27.0	32.2	26.3												
	Geo. Std.Dev.		1.42	1.45	1.50	1.39	1.46													
10	Maximum		94.80	109.0	113.0	81.7	101.6	98	77	80	87	122	72	122	119	91	83	143	75	
	Minimum		18.30	19.0	21.0	23.4	12.8	19	21	18	23	19	17	16	16	18	20	20	16	
	Arith. Mean		44.4	45.3	43.0	47.2	42.8	41.4	46.0	46.2	51.2	53.1	38.2	42.9	45.3	36.6	41.9	52.8	42	
	Geo. Mean		41.6	42.5	39.0	45.4	40.5	39.2	43.6	43.3	48.9	48.4	36.2	39.5	41.3	36.3	39.3	47.4		
	Geo. Std.Dev.		1.43	1.43	1.54	1.35	1.40	1.40	1.41	1.45	1.33	1.54	1.40	1.50	1.55	1.44	1.45	1.57		

TABLE 12 (cont.)

TOTAL SUSPENDED PARTICULATE ug/m3
1971-1989

Site No.	Parameter	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
11	Maximum		69.9	77.8	134.3	299.9	60.8													
	Minimum		11.9	11.5	13.5	13.5	10.9													
	Arith.Mean		32.1	30.8	34.4	44.9														
	Geo.Mean		29.2	28.9	29.4	37.7														
	Geo.Std.Dev.		1.51	1.53	1.70	1.67														
12	Maximum		68.1	79.6	200.7	64.7	53.7	66	69	85	107	122	62	116	65	144	97	92	51	49
	Minimum		11.2	11.0	12.8	18.2	7.0	14	14	13	14	18	10	12	14	14	16	3	9	13
	Arith.Mean		29.6	31.7	34.9	34.2	26.9	29.8	29.0	35.0	38.5	40.8	27.3	30.4	31.0	34.3	31.0	35.5	30	27.4
	Geo.Mean			26.9	29.6	29.2	32.4	25.1	27.9	27.2	31.7	35.8	37.0	25.0	27.2	31.6	28.9	31.2	28.2	28.0
	Geo.Std.Dev.		1.54	1.43	1.70	1.39	1.47	1.43	1.43	1.56	1.54	1.55	1.52	1.57	1.48	1.47	1.54	1.75	14.9	1.39
16	Maximum						130.1	76	136	87	68	96	128	73	125	102	97	102	115	157
	Minimum						14.6	12	14	14	19	16	9	9	11	11	16	4	12	10
	Arith.Mean						35.0	30.9	31.5	37.3	34.2	43.4	26.5	27.8	33.6	32.8	31.0	37.0	37.	37.1
	Geo.Mean						31.0	38.2	28.7	33.8	32.1	38.4	23.5	25.2	29.8	29.4	29.9	31.8	33.1	32.2
	Geo.Std.Dev.						1.60	1.52	1.50	1.57	1.44	1.66	1.60	1.54	1.61	1.60	1.54	1.82	1.61	1.65
17	Maximum							69												
	Minimum							10												
	Arith.Mean						34.6													
	Geo.Mean						31.6													
	Geo.Std.Dev.						1.53													
18/20	Maximum							63	76											
	Minimum							9	16											
	Arith.Mean								30.8											
	Geo.Mean								28.8											
	Geo.Std.Dev.								1.44											

TABLE 12(cont.)

TOTAL SUSPENDED PARTICULATE ug/m^3
1971-1989

Site No.	Parameter	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
19/23	Maximum								121	16	110	166	87	102	110					
	Minimum								20	20	31	25	16	23	16					
	Arith. Mean								52.9	57.5	58.9	62.7	47.8	45.8	50.9					
	Geo. Mean								49.6	53.9	56.5	56.6	45.1	43.1	47.2					
	Geo. Std.Dev.								1.45	1.45	1.34	1.57	1.41	1.42	1.46					
20	Maximum									122	164	177	85	100	77	131	110	102	107	
	Minimum									21	16	21	12	19	14	19	14	11	16	
	Arith. Mean									50.6	52.0	55.6	41.8	40.5	42.0	42.3	40.1	43.8	41	
	Geo. Mean									46.4	47.9	50.6	38.6	38.1	39.2	38.7	36.4	39.7	38	
	Geo. Std.Dev.									1.52	1.48	1.56	1.52	1.41	1.47	1.52	1.54	1.61	1.52	
24	Maximum															82	101	96	102	134
	Minimum															16	18	1	13	18
	Arith Mean															38.7	41.0	44.3	41	49.8
	Geo. Mean															35.5	37.5	37.9	37	42.16
	Geo. Std. Dev.															1.52	1.53	2.0	1.58	1.76
25	Maximum																		87	74
	Minimum																		21	22
	Arith. Mean																		41	41.8
	Geo. Mean																			39.8
	Geo. Std. Dev.																			1.37
26	Maximum																	205	99	56
	Minimum																	8	10	14
	Arith. Mean																	38.5	34	27.8
	Geo. Mean																	28.8	29.8	26.2
	Geo. Std.Dev.																	1.99	1.64	1.39
27	Maximum																		65	112
	Minimum																		14	21
	Arith. Mean																		35	39.8
	Geo. Mean																		33	37.3
	Geo. Std.Dev.																		1.43	1.41

TABLE 13

GASEOUS SAMPLING
MAXIMUM AMBIENT AIR CONCENTRATIONS, PPM
1970-1989

Site No.	Sampling Dates	Sulfur Dioxide			Total Oxidants		Ozone	
		1 Hour	3 Hour	24 Hour	1 Hour	8 Hour	1 Hour	8 Hour
1	07/17-07/31/70	0.094	0.038	0.007	0.114	0.073	--	--
	04/12-04/27/71	0.044	0.028	>0.006	>0.188	>0.130	--	--
	07/16-07/30/71	0.035	0.012	0.002	0.032	0.026	--	--
	11/14-12/31/72	0.023	0.021	0.003	>0.187	>0.040	--	--
	01/01-11/14/73	0.042	0.034	0.004	--	--	--	--
	11/14-12/31/73	0.015	0.008	0.001	--	--	--	--
	01/01-11/01/73				0.155	0.063		
	09/06-12/31/73						>0.100	>0.071
	01/01-12/31/74	0.075	0.052	0.023			0.077	0.055
	01/01-12/31/75	0.062	0.025	0.008	--	--	0.104	0.077
	01/01-12/31/76	0.055	0.034	0.021	--	--	0.148	0.122
	01/01-12/31/77	0.019	0.015	0.009	--	--	0.106	0.088
	01/01-12/31/78				--	--	0.075	0.066
	04/01-06/30/78	0.030	0.022	0.008	--	--	--	--
	01/01-10/22/79	0.024	0.017	0.016	--	--	--	--
2	06/16-07/02/70	0.035	0.026	0.010	0.104	0.093	--	--
	05/11-05/25/71	0.191	0.142	0.028	0.010	0.004	--	--
	08/13-08/27/71	0.033	0.015	0.003	0.016	0.018	--	--
3	07/02-07/17/70	0.196	0.128	0.028	0.176	0.086	--	--
	04/27-05/11/71	>0.500	0.324	0.060	0.111	0.055	--	--
	07/30-08/13/71	0.064	0.035	0.005	0.007	0.001	--	--
	05/18-06/30/72	0.053	0.032	0.006	0.116	0.071	--	--
	09/03-12/31/76	--	--	0.004	--	--	--	--
	01/01-12/31/77	--		0.004	--	--	--	--
4	07/31-08/14/70	0.031	0.024	0.010	0.129	0.089	--	--
	03/26-04/12/71	0.044	0.034	0.012	0.110	0.106	--	--
	09/23-10/04/71	0.080	0.035	0.006	0.056	0.048	--	--
	11/10-11/19/71	0.000	0.000	0.000	0.078	0.073	--	--

TABLE 13

GASEOUS SAMPLING
MAXIMUM AMBIENT AIR CONCENTRATIONS, PPM
1970-1989 (continued)

Site No.	Sampling Dates	Sulfur Dioxide 1 Hour	Sulfur Dioxide 3 Hour	Sulfur Dioxide 24 Hour	Total Oxidants 1 Hour	Total Oxidants 8 Hour	Ozone 1 Hour	Ozone 8 Hour
5	09/04-09/18/70	0.069	0.029	0.003	0.092	0.066		
	03/12-03/26/71	0.060	0.028	0.005	0.013	0.086		
	10/19-11/01/71	0.006	0.002	0.0003	0.136	0.101		
6	08/21-09/04/70	0.076	0.048	0.013	0.048	0.037		
	01/27-02/12/71	0.132	0.098	0.017	0.110	0.095		
	12/29-01/12/72	0.068	0.034	0.006	0.000	0.000		
	07/05-08/01/72	0.015	0.012	0.003	0.050	0.027		
7	09/28-10/12/70	0.106	0.048	0.006	0.076	0.068		
	02/26-03/12/71	0.026	0.008	>0.003	0.110	0.093		
	11/19-12/10/71	0.015	0.006	0.001	0.038	0.016		
8	10/12-10/26/70	0.000	0.000	0.000	0.078	0.061		
	02/12-02/26/71	>0.288	0.125	>0.030	0.103	0.076		
	02/10-12/29/71	>0.267	0.217	>0.039	0.012	0.006		
	09/21/72-05/01/73	0.068	0.028	0.007				
	12/01/72-05/18/73	0.176	0.098	0.044				
	12/18-12/31/73	0.153	0.113	0.025				
	01/01-09/27/74	0.065	0.031	0.004				
	07/08-12/31/75	0.075	0.074	0.029				
	01/01-12/31/76	0.085	0.078	0.051				
	01/01-12/31/77	0.033	0.029	0.016				
	01/01-05/19/78	0.047	0.043	0.019				
16	01/03-12/31/80						.098	.081
	01/01-12/31/81						.095	.074
	01/01-12/31/82						.080	.073
	01/01-12/31/83						.087	.071
	01/01-12/31/84						.095	.079
	01/01-12/31/85						.094	.071
	01/01-12/31/86						.102	.092
	01/01-12/31/87						.092	.079
	01/01-12/31/88						.087	.073
	01/01- 8/21/89						.099	.084
17	09/27-12/31/76			0.003				
	01/01-12/31/77			0.003				

TABLE 13

GASEOUS SAMPLING
MAXIMUM AMBIENT AIR CONCENTRATIONS, PPM
1970-1989(continued)

Site		Sulfur Dioxide			Total Oxidants		Ozone	
No.	Sampling Dates	1 Hour	3 Hour	24 Hour	1 Hour	8 Hour	1 Hour	8 Hour
21	03/01-12/31/79						.079	.070
	01/01-12/31/80						.110	.080
	01/01-12/31/81						.103	.079
	01/01-12/31/82						.122	.073
	01/01-12/31/83						.092	.073
	01/01-12/31/84						.090	.072
	01/01-12/31/85						.089	.076
	01/01-12/31/86						.096	.055
	01/01-12/31/87						.110	.078
	01/01-12/31/88						.107	.077
	01/01-12/31/89						.113	.086
22	07/24-12/31/80	0.016	0.014	0.013				
	01/01-12/31/81	0.034	0.031	0.019				
	01/01-12/31/82	0.067	0.053	0.019				
	01/01-12/31/83	0.035	0.025	0.015				
	01/01-12/31/84	0.062	0.052	0.014				
	01/01-12/31/85	0.073	0.040	0.009				
	01/01-12/31/86	0.040	0.022	0.010				
	01/01-12/31/87	0.057	0.020	0.006				
	01/01-05/12/88	0.019	0.015	0.003				
28	05/12-12/31/88	0.027	0.022	0.004				
	01/01-12/31/89	0.060	0.039	0.010				
29	08/22-12/31/89						.073	.060

TABLE 13

MAXIMUM AMBIENT AIR CONCENTRATION, PPM
1970-1989

Site No.	Sampling Dates	Nitrogen Dioxide			Carbon Monoxide		Total Hydrocarbons	
		1 Hour	8 Hour	Ar./Mean	1 Hour	8 Hour	1 Hour	8 Hour
1	07/17-07/31/70	0.097	0.068	0.016				
	04/12-04/27/71	0.147	0.079	0.026				
	07/16-07/30/71	0.067	0.056	0.018	3.6	3.1		
	11/14-12/31/72	0.092	0.079	0.020	7.0	3.7	6.5	3.2
	01/01-11/15/73	0.060	0.047	0.007				
	01/01-12/31/73				8.9	6.3	5.5	3.3
	01/01-12/31/74	0.080	0.052	0.015	10.5	8.8	5.8	4.4
	01/01-12/31/75	0.125	0.083	0.015	8.6	5.0	5.2	3.0
	01/01-12/31/76	0.083	0.054	0.009	10.5	5.2	5.3	3.7
	01/01-12/31/77	0.071	0.044	0.017	11.8	8.5	5.2	3.6
	01/01-12/31/78	0.089	0.070	0.012	8.6	4.5		
	10/18-12/31/78						5.8	3.2
	01/01-11/28/79	0.078	0.056	0.016				
	01/01-11/08/79				7.8	3.1		
	01/01-12/31/79						8.3	2.9
	01/01-12/31/80	0.137	0.088	0.018	9.8	5.7	9.6	6.2
	01/01-12/31/81	0.152	0.107	0.012	13.3	5.8		
	01/01-08/14/81						8.4	3.5
	01/01-12/31/82	0.069	0.053	0.038	21.3	8.1		
	01/01-12/31/83	0.069	0.055	0.010	8.9	6.5		
	01/01-12/31/84	0.152	0.083	0.015	14.0	5.1		
	01/01-12/31/85	0.197	0.068	0.012	7.4	3.3		
	01/01-06/19/86	0.082	0.057	0.018	7.6	4.9		
2	06/16-07/02/70	0.044	0.032	0.010				
	05/11-05/25/71	0.054	0.040	0.013	2.2	0.3		
	08/12-08/27/71	0.073	0.060	0.013	0.0	0.0		
3	07/02-07/17/70	0.084	0.060	0.010				
	04/27-05/11/71	0.096	0.066	0.017				
	07/30-08/13/71	0.083	0.069	0.018	3.2	0.9		
	05/18-06/30/72	0.088	0.059	0.010	0.0	0.0	3.2	2.2
	01/01-12/31/76			0.006				
	01/01-12/31/77			0.010				
	01/01-03/31/78			0.014				

TABLE 13

MAXIMUM AMBIENT AIR CONCENTRATION, PPM
1970-1989 (continued)

Site		Nitrogen Dioxide			Carbon Monoxide		Total Hydrocarbons	
No.	Sampling Dates	1 Hour	8 Hour	Ar./Mean	1 Hour	8 Hour	1 Hour	8 Hour
4	07/31-08/14/70	0.097	0.068	0.016				
	03/26-04/12/71	0.118	0.107	0.018	2.1	0.3		
	09/23-10/14/71	0.059	0.041	0.018	0.0	0.0		
	11/10-11/19/71	0.124	0.101	0.020	0.0	0.0		
5	09/04-09/18/70	0.055	0.051	0.013				
	03/12-03/26/71	0.146	0.113	0.018	2.1	0.4		
	10/19-11/01/71	0.117	0.093	0.029				
6	08/21-09/04/70	0.064	0.048	0.015				
	01/27-02/12/71	>0.200	>0.187	0.047	9.6	4.2		
	12/29-01/12/71	0.079	0.069	0.022	2.6	0.4		
	07/05-08/01/72	0.065	0.055	0.011				
7	09/28-10/12/71	0.031	0.018	0.007				
	02/26-03/12/71	0.106	0.081	0.016	0.8	0.1		
	11/09-12/10/71	0.074	0.055	0.19	2.2	2.0		
8	10/12-10/26/70	0.118	0.067	0.017				
	02/12-02/26/71	0.152	0.091	0.022	5.2	3.0		
	12/10-12/29/71	0.076	0.048	0.024	0.0	0.0		
13	11/14-12/31/73			0.003				
	01/01-12/31/74			0.004				
	01/01-12/31/75			0.008				
	01/01-12/31/76			0.005				
	01/01-12/31/77			0.008				
	01/01-12/31/78			0.010				
14	11/14-12/31/73			0.004				
	01/01-12/31/74			0.005				
	01/01-12/31/75			0.012				
	01/01-12/31/76			0.008				
	01/01-12/31/77			0.015				
	01/01-12/31/78			0.015				
25	06/27-12/31/86	0.043	0.039	0.011	7.2	3.4		
	01/01-12/31/87	0.117	0.055	0.012	7.1	4.1		
	01/01-12/31/88	0.073	0.055	0.014	7.3	4.6		
	01/01-12/31/89	0.062	0.056	0.013	7.2	5.1		

TABLE 14

NITROGEN DIOXIDE DATA
SITE NUMBER 25
1989

Month	Hours	Arith. (a) Avg., ppm	Max. 24 Hr. Avg., ppm
J	702	.017	.027
F	606	.013	.025
M	700	.010	.020
A	682	.013	.030
M	704	.013	.023
J	657	.007	.015
J	701	.009	.019
A	695	.011	.025
S	663	.009	.017
O	684	.013	.025
N	672	.016	.032
D	500	.023	.039
ANNUAL	7966	.013	.039

TABLE 15

AMBIENT AIR-NITROGEN DIOXIDE, PPM
SITE NUMBER 25
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum	0.062	0.057	0.059	0.062	0.062		
8 Hr. Maximum	0.041	0.046	0.031	0.056	0.056		
24 Hr. Maximum	0.027	0.03	0.025	0.039	0.039		
Arith. Mean.	0.013	0.011	0.010	0.017	0.074		
Concentration Range			Hours			%	Cum. %
< .010	795	1017	1189	526	3527	50.82	50.82
010 - .019	788	0	683	780	2251	32.44	83.26
.020 - .029	310	0	155	355	820	11.82	95.07
.030 - .039	82	0	26	132	240	3.46	98.53
.040 - .049	22	0	5	39	66	0.95	99.48
.050 - .059	9	0	1	21	31	0.45	99.93
.060 - .069	2	0	0	3	5	.07	100.00
.070 - .079							
.080 - .089							
.090 - .099							
.100 - .109							
.110 - .119							
.120 - .129							
.130 - .139							
.140 - .149							
.150 - .159							
.160 - .169							
.170 -.179							
Total	2008	1017	2059	1856	6940	79.22	
Downtime	152	1167	149	352	1820	20.78	
Total Time at Site	2160	2184	2208	2208	8760		

TABLE 16

CARBON MONOXIDE DATA
SITE NUMBER 25
1989

Month	Hours	Arith. Mean ppm	1 Hr. Max. ppm	No. of Times 1 Hr. Standard (35 ppm) exceeded	8 Hr. Max. ppm	No. of Times 8 Hr. Standard (9 ppm) exceeded
J	783	.8	6.7	-0-	3.7	-0-
F	630	.7	6.3	-0-	3.0	-0-
M	736	.6	6.1	-0-	2.0	-0-
A	710	.7	5.3	-0-	.3	-0-
M	735	.7	3.3	-0-	1.6	-0-
J	669	.6	4	-0-	1.6	-0-
J	705	.5	4.8	-0-	2.5	-0-
A	704	.7	4.5	-0-	2.1	-0-
S	683	.7	5.5	-0-	2.3	-0-
O	702	.8	5.9	-0-	2.4	-0-
N	684	.8	4.6	-0-	2.5	-0-
D	681	1.2	7.2	-0-	5.1	-0-
ANNUAL	8372	.7	7.2	-0-	5.1	-0-

TABLE 17

AMBIENT AIR, CARBON MONOXIDE, ppm
SITE NUMBER 25
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum	6.7	5.3	5.5	7.2	7.2		
8 Hr. Maximum	3.7	2.0	2.5	5.1	5.1		
24 Hr. Maximum	2.0	1.6	1.5	3.1	3.1		
Mean.(weighed)	.7	.7	.6	.9	.7		
Concentration Range			Hours			%	Cum. %
< 2.0	1985	2058	1988	1907	7938	95.45	95.45
2.0 - 2.4	40	0	40	63	143	1.72	97.17
2.5 - 2.9	26	0	25	33	84	1.01	98.18
3.0 - 3.4	12	0	16	24	52	.63	98.81
3.5 - 3.9	14	0	6	16	36	.48	99.24
4.0 - 4.4	9	0	7	8	24	.29	99.53
4.5 - 4.9	2	0	7	3	12	.14	99.68
5.0 - 5.4	5	0	1	5	11	.13	99.81
5.5 - 5.9	1	0	2	4	7	.08	99.89
6.0 - 6.4	4	0	0	2	6	.07	99.96
6.5 - 6.9	1	0	0	1	2	02	99.99
7.0 - 7.4	0	0	0	1	1	.01	100.00
7.5 - 7.9							
8.0 - 8.4							
8.5 - 8.9							
9.0 - 9.4							
9.5 - 9.9							
10.0 - 10.4							
10.5 - 10.9							
11.0 - 11.4							
11.5 - 11.9>							
Total	2099	2058	2092	2067	8316	94.93	
Downtime	61	126	116	141	444	5.07	
Total Time at Site	2160	2184	2208	2208	8760		

TABLE 18

OZONE DATA
SITE NUMBER 16
1989

Month	Hours	Arith. Mean ppm	1 Hour Maximum ppm	No. of Hours 1 Hr. Florida Std. or Federal Std. (0.12 ppm) Exceeded
J	734	.016	.054	-0-
F	665	.022	.069	-0-
M	734	.018	.088	-0-
A	695	.027	.099	-0-
M	683	.025	.078	-0-
J	702	.014	.059	-0-
J	729	.015	.051	-0-
A	153	.021	.058	-0-
S	0	0	0	-0-
O	0	0	0	-0-
N	0	0	0	-0-
D	0	0	0	-0-
ANNUAL	5095	.020	.099	-0-

Site 16 Relocated to Site 29 - August 1989.

TABLE 19

AMBIENT AIR-OZONE, PPM
SITE NUMBER 16
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum	.088	.099	.058	DISC	.099		
8 Hr. Maximum	.069	.084	.053	DISC	.084		
24 Hr. Maximum	.047	.046	.030	DISC	.047		
Mean.	.019	.022	.016	DISC	.020		
Concentration Range			Hours			%	Cum. %
< .010	793	650	366	0	1809	49.36	49.36
.010 - .019	421	0	227	0	648	17.68	67.04
.020 - .029	364	0	155	0	519	14.16	81.20
.030 - .039	355	0	91	0	446	12.17	93.37
.040 - .049	133	0	27	0	160	4.37	97.74
.050 - .059	45	0	16	0	61	1.66	99.40
.060 - .069	13	0	0	0	13	.35	99.75
.070 - .079	8	0	0	0	8	.22	99.97
.080 - .089	1	0	0	0	1	.03	100.00
.090 - .099							
Total	2133	650	882	0	3665	70.37	
Downtime	27	1534	18	0	1579	29.63	
Total Time at Site	2160	2184	864	0	5208		

TABLE 20

OZONE DATA
SITE NUMBER 21
1989

Month	Hours	Arith. Mean ppm	1 Hour Maximum ppm	No. of Hours 1 Hr. Florida Std. or Federal Std. (0.12 ppm) Exceeded
J	737	.015	.057	-0-
F	667	.022	.074	-0-
M	738	.020	.101	-0-
A	666	.026	.113	-0-
M	734	.028	.081	-0-
J	704	.016	.056	-0-
J	617	.015	.058	-0-
A	733	.016	.079	-0-
S	715	.014	.061	-0-
O	733	.019	.057	-0-
N	712	.018	.067	-0-
D	584	.017	.058	-0-
ANNUAL	8340	.019	.113	-0-

TABLE 21

AMBIENT AIR-OZONE, PPM
SITE NUMBER 21 ROYAL PALM BEACH
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum	.101	.113	.079	.067	.113		
8 Hr. Maximum	.073	.086	.064	.057	.086		
24 Hr. Maximum	.048	.049	.043	.045	.049		
Mean. (weighed)	.019	.023	.015	.018	.088		
Concentration Range			Hours			%	Cum. %
< .010	788	611	894	691	2984	43.58	43.58
.010 - .019	339	0	479	408	1226	17.91	61.49
.020 - .029	408	0	410	430	1248	18.23	79.71
.030 - .039	406	0	184	345	935	13.66	93.37
.040 - .049	143	0	47	131	321	4.69	98.06
.050 - .059	36	0	36	20	92	1.34	99.40
.060 - .069	10	0	10	4	24	.35	99.75
.070 - .079	9	0	5	0	14	.20	99.96
.080 - .089	2	0	0	0	2	.03	99.99
.090 - .099	0	0	0	0	0	.00	99.99
.100 - .109	1	0	0	0	1	.01	100.00
Total	2142	611	2065	2029	6847	78.16	
Downtime	18	1573	143	179	1913	21.84	
Total Time at Site	2160	2184	2208	2208	8760		

TABLE 21A

AMBIENT AIR-OZONE, PPM
SITE NUMBER 29 - DELRAY BEACH
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum			.053	.073	.073		
8 Hr. Maximum			.045	.060	.060		
24 Hr. Maximum			.031	.047	.047		
Mean.			.016	.022	.235		
Concentration Range			Hours			%	Cum. %
< .010			118	479	597	21.44	21.44
.010 - .019			423	389	812	29.16	50.59
.020 - .029			218	462	680	24.42	75.01
.030 - .039			28	408	436	15.66	90.66
.040 - .049			9	207	216	7.76	98.42
.050 - .059			5	28	33	1.18	99.61
.060 - .069			0	7	7	0.25	99.86
.070 - .079			0	4	4	0.14	100.00
.080 - .089							
.090 - .099							
Total			801	1984	2785	87.25	
Downtime			183	224	407	12.75	
Total Time at Site			984	2208	3192		

TABLE 22

OZONE DESIGN VALUES 1980-1989
SITE NUMBER 16
WEIBULL DISTRIBUTIONS

Year	Number of Excursions ≥ 0.12 ppm	Number of Days Sampled	% Complete	Maximum 1 Hr. Avg. ppm	2nd Max. 1 Hr. Avg. ppm	Annual Design Value ppm	Three Year Design Value ppm
1980	-0-	292	79.78	.098	.083	.097	N.A.
1981	-0-	318	87.12	.095	.089	.095	N.A.
1982	-0-	352	96.44	.080	.078	.084	.095
1983	-0-	298	81.64	.087	.085	.088	.088
1984	-0-	250	68.31	.095	.089	.096	.089
1985	-0-	329	90.14	.094	.093	.097	.101
1986	-0-	345	94.52	.102	.079	.104	.086
1987	-0-	353	96.71	.092	.087	.088	.105
1988	-0-	354	96.72	.087	.083	.090	.100
1989	-0-	218	59.73	.099	.090	.105	.099

TABLE 22A
OZONE DESIGN VALUES 1980-1989
SITE NUMBER 29
WEIBULL DISTRIBUTIONS

Year	Number of Excursions ≥ 0.12 ppm	Number of Days Samples	% Complete	Maximum 1 Hr. Avg. ppm	2nd Max. 1 Hr. Avg. ppm	Annual Design Valve ppm	Three Year Design Valve ppm
1989	-0-	117	32.05	.073	.072	.085	N/A

TABLE 23

OZONE DESIGN VALUES 1973-1989
SITE NUMBER 21
WEIBULL DISTRIBUTIONS

Year	Number of Excursions 0.12 ppm	Number of Days Sampled	% Complete	Maximum 1 Hr. Avg. ppm	2nd Max. 1 Hr. Avg. ppm	Annual Design Value ppm	Three Year Design Value ppm
1973	-0-	116	31.78	.111	.104	.130	N.A.
1974	-0-	363	99.45	.077	.074	.078	.106
1975	-0-	331	90.68	.104	.086	.097	.101
1976	3	270	73.97	.148	.142	.154	.123
1977	-0-	323	88.49	.106	.101	.106	.122
1978	-0-	138	37.81	.075	.069	.079	.128
1979	-0-	256	70.14	.082	.076	.081	.092
1980	-0-	299	81.69	.110	.102	.109	.101
1981	-0-	348	95.34	.103	.089	.098	.102
1982	-0-	354	96.99	.122	.080	.106	.106
1983	-0-	332	91.23	.092	.088	.091	.101
1984	-0-	362	98.91	.090	.089	.098	.099
1985	-0-	340	93.15	.089	.087	.092	.093
1986	-0-	349	95.62	.096	.092	.103	.102
1987	-0-	358	98.08	.110	.095	.097	.104
1988	-0-	355	96.99	.107	.101	.105	.093
1989	-0-	350	95.89	.113	.106	.113	.113

TABLE 24A

SULFUR DIOXIDE DATA
SITE NUMBER 22
1989

Month	Hours	Arith. Mean ppm	1 Hr. Max. ppm	3 Hr. Max. ppm	No. of Times 3 Hr. Std. Exceeded (0.5 ppm)	24 Hr. Max. ppm	No. of Times 24 Hr. Std. Exceeded (0.1 ppm)
J	703	.002	.020	0.011	-0-	.004	-0-
F	630	.004	.032	0.019	-0-	.009	-0-
M	700	.002	.007	0.006	-0-	.005	-0-
A	680	.003	.033	0.022	-0-	.007	-0-
M	700	.003	.029	0.025	-0-	.008	-0-
J	676	.002	.023	0.017	-0-	.005	-0-
J	703	.003	.037	0.026	-0-	.008	-0-
A	556	.005	.060	0.039	-0-	.010	-0-
S	674	.001	.012	0.009	-0-	.003	-0-
O	697	.002	.029	0.018		.005	-0-
N	669	.002	.012	0.011	-0-	.005	-0-
D	694	.002	.027	0.022	-0-	.010	-0-
ANNUAL	8082	.002	.060	0.039	-0-	.010	-0-

Site No. 22 discontinued in May and analyzer relocated to Site No.28.

TABLE 24B

SULFUR DIOXIDE DATA
SITE NUMBER 28
1989

Month	Hours	Arith. Mean ppm	1 Hr. Max. ppm	3 Hr. Max. ppm	No. of Times 3 Hr. Std. Exceeded (0.5 ppm)	24 Hr. Max. ppm	No. of Times 24 Hr. Std. Exceeded (0.1 ppm)
J							
F							
M							
A							
M	436	.000	.016	.007	-0-	.003	-0-
J	667	.000	.010	.007	-0-	.002	-0-
J	703	.000	.007	.004	-0-	.001	-0-
A	703	.001	.026	.012	-0-	.004	-0-
S	676	.000	.009	.006	-0-	.002	-0-
O	702	.000	.027	.022	-0-	.004	-0-
N	678	.000	.005	.004	-0-	.001	-0-
D	701	.001	.013	.008	-0-	.003	-0-
ANNUAL	5266	.000	.027	.022	-0-	.004	-0-

TABLE 25A

AMBIENT AIR-SULFUR DIOXIDE, PPM
SITE NUMBER 22
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum	.007	.019			.019		
8 Hr. Maximum	.004	.008			.008		
24 Hr. Maximum	.003	.003			.003		
Mean.	.000	.000			.000		
Concentration Range			Hours			%	Cum. %
< .010	2050	941			2991	99.86	99.86
.010 - .014		2			2	.07	99.93
.015 - .019		2			2	.07	100.00
.020 - .024							
.025 - .029							
.030 - .034							
.035 - .039							
.040 - .044							
.045 - .049							
.050 - .054							
.055 - .059							
.060 - .064							
Total	2050	945			2995	94.00	
Downtime	134	57			191	6.00	
Total Time at Site	2184	1002			3186		

TABLE 25B

AMBIENT AIR-SULFUR DIOXIDE, PPM
SITE NUMBER 28-RIVIERA BEACH
1989

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual		
1 Hr. Maximum	.032	.033	.060	.029	.060		
3 Hr. Maximum	.019	.025	.039	.022	.039		
8 Hr. Maximum	.016	.020	.020	.015	.020		
24 Hr. Maximum	.009	.008	.010	.010	.010		
Arith Mean	.003	.003	.003	.002	.088		
Concentration Range			Hours			%	Cum. %
< .010	2014	2023	1893	2028	7958	98.87	98.87
.010 - .019	10		23	25	58	.72	99.59
.020 - .029	3		3	3	9	.11	99.70
.030 - .039	5		1	1	7	.09	99.79
.040 - .049	0		4	3	7	.09	99.88
.050 - .059	1		5		6	.07	99.95
.060 - .069			2		2	.02	99.98
.070 - .079			0		0	.00	99.98
.080 - .089			1		1	.01	99.99
.090 - .099			0		0	.00	99.99
.100 - .109			0		0	.00	99.99
.110 - .119			1		1	.01	100.00
Total	2033	2023	1933	2060	8049	91.88	
Downtime	127	161	275	148	711	8.12	
Total Time at Site	2160	2184	2208	2208	8760		

IV

AIR QUALITY INDEX

The Environmental Protection Agency (EPA) has developed a uniform standardized daily air quality reporting index, called the Pollutant Standard Index (PSI), locally called the Air Quality Index (AQI), to be used by State and local agencies. The use of this index for reporting air quality was made mandatory on May 10, 1979 in the Federal Register/Vol. 44, No 92/Part 58, Subpart E, Appendix G.

This index is dependent upon measured concentrations of the five pollutants which have been assigned National Ambient Air Quality Standards (NAAQS), Federal Episode Criteria, and Significant Harm levels; i.e., total suspended particulate, carbon monoxide, sulfur dioxide, nitrogen dioxide, and ozone. The index converts air pollution concentrations to a normalized number on a scale of zero to five hundred, with the National Ambient Air Quality Standard for each pollutant being assigned the value of 100. This approach is believed to be easier for the public to understand than a report of actual pollutant concentrations. Index values are calculated for each of the five pollutants. The highest of these is the report value.

Five descriptive words have been choosen to depict daily air quality: "good" (0-50), "moderate" (51-100), "unhealthful" (101-200), "very unhealthful" (201-300), and "hazardous" (301-500). If pollutant concentration warrant, the AQI report is expanded to include identification of the problem pollutant, cautionary statements and generalized health effects.

Adoption of the AQI by many pollution control organizations has reduced the confusion previously encountered due to the existances of many different indices. AQI has several advantages: (1) it is simple and can be easily understood by the public, (2) it can accommodate new pollutants, (3) it is based on a reasonable scientific premise, (4) it relates to National Ambient Air Quality Standards, Federal Episode Criteria, and Significant Harm Levels, and (5) it exhibits day to day variations.

The Palm Beach County Public Health Unit samples for the above pollutants and has utilized the Air Quality Index since April 28, 1976. A typical air quality report for Palm Beach County would be "The Air Quality Index is 31. The ambient air quality is within the good range, the pollutant was ozone." Index advisories are issued to local newspapers, televisions and radio stations each morning and afternoon Monday through Friday. The AQI can also be obtained by calling the West Palm Beach office for a recorded message at (407)355-3962. Table 26 gives a statistical analysis of the monthly morning and afternoon values. As noted, TSP or Ozone concentrations accounted for all values in the moderate range.

TABLE 26A

AIR QUALITY INDEX
WEST PALM BEACH
1989

A.M. DATA

	Days		A.Q.I.							
Month	Good	Moderate	Maximum			Minimum			Mean.	SD.
			(TSP)		(03)	(TSP)		(03)		
Jan.	20	0	*	43			20	*	31	6
Feb.	17	3	*	77		*	20		37	14
March	21	2	*	54			12	*	33	13
April	18	2	*	66			21	*	37	12
May	17	5	*	57			19	*	41	12
June	19	3	*	56			18	*	33	12
July	20	0	*	46		*	16		32	8
Aug.	22	1	*	51			17	*	34	9
Sept.	19	1	*	51		*	20		30	8
Oct.	22	0	*	45		*	17		31	7
Nov.	16	3	*	52			12	*	33	11
Dec.	20	0	*	45		*	15		32	8
Year	231	20	*	77			12	*	34	3

TABLE 26B

AIR QUALITY INDEX
WEST PALM BEACH
1989

P.M. DATA

	Days		A.Q.I.			
Month	Good	Moderate	Maximum (TSP) (03)	Minimum (TSP) (03))	Mean.	SD.
Jan.	19	1	55 *	22 *	34	7
Feb.	15	5	* 77	* 25	41	15
March	19	4	75 *	14 *	37	14
April	15	5	89 *	24 *	47	15
May	15	7	60 *	20 *	44	12
June	18	4	* 56	20	37	11
July	20	0	49 *	22 *	35	7
Aug.	20	3	55 *	22 *	37	9
Sept.	18	2	* 51 *	* 23	35	8
Oct.	18	4	82 *	28 *	41	14
Nov.	15	4	54 *	* 17	37	11
Dec.	20	0	49 *	* 18	36	8
Year	212	39	89 *	14 *	38	3

V

EMISSION INVENTORY

INTRODUCTION

Air pollution evolved as an undesired by-product of the technological advancement of our modern society. On the other hand, this modern society also developed technological methods to prevent and control these atmospheric emissions of air pollutants.

Defining air pollution problem areas by determining the actual sources and components of air pollution is a prime step towards abating air pollution, and subsequently attaining and maintaining national ambient air quality standards (NAAQS). The emission inventory accomplishes this crucial step by addressing the sources, types and quantities of air pollution emissions.

A comprehensive emission inventory is an essential tool for any Air Pollution regulatory agency. The inventory provides information for the design of an air sampling and analysis program, identifies the relative contribution of the various pollution sources, offers data for the development of control strategies, and makes this information available for our regional planning authorities.

A number of factors used in compiling the emission inventory, such as reported fuel usage figures, fuel composition, process information and especially emission factors, are somewhat limited in preciseness due to the state-of-the-art knowledge available.

Never-the-less, the emission inventory, by nature of its magnitude, still yields results with adequate accuracy for the purpose and intent of our county air pollution program.

The emission inventory presented in this report represents calculated emissions from major point sources and generalized acceptable estimates of emissions from area sources (Table 27 and 28, respectively).

MAJOR POINT SOURCES

Palm Beach County has 23 major air pollution sources which emit a significant emission tonage of one or more types of air pollutants. Table 27 lists these sources by name and details air emissions by pollutant type in tons per year for 1989. A constantly unpredictable economy has caused a reduction in emission tonage for certain sources due to reduced activity, whereas other sources have actually increased their activity, hence increased their emission tonage above prior years. Data used to compile and quantify the emission levels for each source was gathered using specific data procurement techniques, such as annual operating reports, process material balances, engineering appraisals, and special questionaires.

AREA SOURCES

Palm Beach County has many sources which emit small quantities of air pollutants, and collectively their impact is significant to our atmosphere.

Therefore, these sources must be accounted for in the emission inventory. Table 28 lists major area source categories and details respective air emissions by types in tons per year for 1989. The object of area source calculations is to obtain an accurate estimate of this collective contribution on total emissions. Such an estimate may never be exact due to the difficulties of determining the emissions from every source too small and/or too numerous to be surveyed individually. Ultimately, however, this area source estimate becomes more valid as it is applied to a large number of sources since prescribed techniques were used in conjunction with the activity levels associated with each source category.

References for emission factors utilized are:

(1) Compilation of Air Pollution Emission Factors, AP-42, Volume I, Fourth Edition, November 1985, published by the U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 27711.

(2) Guidelines for Air Quality Maintenance Planning and Analysis, Volume 7: Projecting County Emissions, EPA-450/4-74-008, Second Edition, January 1975, U.S. Environmental Protection Agency, Office of Air and Waste Management,

Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 27711.

(3) National Emissions Data System (NEDS) Source Classification Code and Emission Factor Listing, January 1979, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Monitoring and Data Analysis Division, National Air Data Branch, Research Triangle Park, North Carolina, 27711.

(4) Procedures for the Preparation of Emission Inventories for Volatile Organic Compounds, Volume I, EPA-450/2-77-028, December 1977, U.S. Environmental Protection Agency, Office of Air and Water Management, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 27711.

(5) Mobile Source Emission Factors (For Low-Altitude Areas Only), EPA-400/9-78-006, March 1978, U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Transporatation and Land Use Policy, Washington, D.C. 20460.

(6) Revisions to the State Implementation Plan (SIP) for Palm Beach County Florida, April 1983, Metropolitan Planning Organization of Palm Beach County.

(7) Procedures for Emission Inventory Preparation, Volumes I-IV, EPA-450/4-81-026A, September 1981, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 27711.

(8) County Business Patterns 1984 Florida CBP-84-11, July 1986, U.S. Department of Commerce U.S. Government Printing Office Washington, D.C.

(9) Mobile 3; Mobile Source Emissions Model, EPA 460/3-84-002, June 1984, U.S. Environmental Protection Agency, Office of Mobile Sosurce, Emission Control Technology Division, Test and Evaluation Branch, 2625 Plymouth Road, Ann Arbor, MI 48105.

(10) Forest Statistics for South Florida, 1988. US Department of Agriculture Resource Bulletin #SE-100.

TABLE 27

1989 SUMMARY
AIR POLLUTION EMISSIONS
PALM BEACH COUNTY, FLORIDA
TONS/YEAR
POINT SOURCES

A.P.I.S. No 50-50	Source Name	Parti-culates	SO_2	SO_3	CO	CH_4	NO_2	VOC	TOTAL
0005	Okeelanta Corp.	477.6	570.1	2.77	592.4	224.2	683.3	364.7	2915.7
0015	Boca Raton Hotel	0.2	.2	---	0.7	0.1	3.5	.21	4.5
0016	Atlantic Sugar	186.9	144.5	0.27	206.6	78.3	174.3	127.5	918.4
0018	Q.O. Chemicals	2.77	50.6	0.70	6.4	0.1	25.7	0.3	86.5
0019	Osceola Farms	312.7	299.7	1.17	348.2	131.9	318.2	214.7	1626.6
0021	Pratt & Whitney	6.2	14.8	---	6.1	0.2	26.1	61.1	114.5
0026	Sugar Cane Growers Coop.	629.5	1761.0	0.11	508.9	193.3	308.7	315.3	3716.8
0042	Fla. Power & Light	573.0	6630.0	---	433.0	13.7	5890.0	40.1	13579.9
0045	Lake Worth Utilities	7.9	17.2	10	127.9	18.3	637.9	23.1	832.2
0046	LaFarge Corporation	2.2							2.2
0061	U.S. Sugar Bryant	388.4	312.7	0.10	507.9	192.9	305.4	314.8	2022.2
0073	Talisman Sugar Corp.	273.3	202.4	0.10	323.6	122.9	196.2	200.5	1319.0
0081	A.G. Holley Hosp.	0.44	0.2	---	0.1	---	0.2	0.2	1.6
0084	Eastern Cement	22.7							22.7
0087	Ranger Construction	1.5	30.8	---	---	4.9	6.3	4.9	48.4
0088	City of Pahokee	5.7	.2	---	8.1	2.4	2.5	2.4	23.1
0155	F.H. Foster Oil Corp							10.9	10.9
0158	Cooper Oil Co.							16.9	16.9
0161	Howell Oil							13.2	13.2
0162	Charles Brown Oil							26.5	26.5
0212	Weekly Asphalt	0.5	4.7		1.0		1.0	---	---
0186	Parkway Asphalt	1.9	18.9		3.5	---	3.3	2.6	30.2
POINT SOURCE TOTALS		2892.9	10054.9	5.4	3074.0	983.0	8581.6	1739.9	27331.6

TABLE 28
1989 SUMMARY
AIR POLLUTION EMISSIONS
PALM BEACH COUNTY, FLORIDA
TON/YEAR
AREA SOURCES

	Particulates	SO_2	SO_3	CO	CH_4	NO_2	VOC	Totals
MOBILE SOURCES:								
Highway/Off Highway	2373.0	1571.0		227177.0		24363.0	29173.0	284657.0
Aircraft	15.8	59.9		6176.0	2.3	475.0	482.0	7210.2
Vessels	20.0	218.0		7779.0	0.5	416.0	2217.0	10651.0
Railroads	35.0	80.0		182.0	2.8	545.0	128.0	972.0
FUEL COMBUSTION:								
Miscellaneous	18.7	310.0	4.4	47.9	12.5	199.3	9.3	602.1
MINERAL PRODUCTS:								
Concrete Batching	105.8							105.8
SOLID WASTE DISPOSAL:								
Incineration	44.7	4.2		19.2	0.4	37.7	4.7	110.9
Open Burning	466.3			3839.8	156.3	164.6	521.1	5148.1
SUGAR CANE FIELDS:								
Burning	11337.2			113372.0	4858.8		12956.8	142524.8
VOLATILE ORGANIC EMISSIONS:								
Storage & Marketing of Petrol. Prod.							2862.0	2862.0
Industrial Processes							241.4	241.4
Industrial Surface Coating							123.2	123.2
Non Industrial Surface Coating							2812.9	2812.9
Other Solvent Use							4382.5	4382.5
Area Source Totals	14416.5	2243.0	4.4	358592.9	5033.6	26200.6	55913.9	462403.7
Point Source Totals	2892.9	10054.9	5.3	3074.0	983.0	8581.6	1739.9	27331.6
GRAND TOTALS	17309.4	12297.9	9.7	361667.0	6016.7	34782.2	57653.8	489735.4